

Abatement technology available

Industry often is prone to assert that pollution abatement is not feasible because the technology is not yet available. In some instances—such as the nonpolluting uses of fossil fuels—the claim is valid.

But, says the board of advisers of the Dreyfus Foundation in New York City, generally speaking pollution abatement technology *does* exist. This was the basis for a decision by the board that the foundation should not support new research programs in this technology.

William L. Evers, executive director of the foundation, told a group of engineering and science professors at Manhattan College that the policy has its faults, "but it was adopted primarily to put pressure on the political segment of our society." He suggested that a wider awareness of the technology that does exist might cause politicians to act more firmly in pollution abatement legislation and enforcement.

Sea slugs incorporate chloroplasts

Marine biologists and ecologists tend to reject the Victorian notion of "nature, red in tooth and claw." They favor the less anthropocentric idea that marine ecosystems are, in a sense, organisms themselves, and that one organism eating another is simply a transfer of nutrients within a single organism.

Support for this theory comes from the work of Richard Green, Notre Dame University biologist, who reports that certain sea slugs maintain intact in their digestive tracts the chloroplasts from algae they have eaten. One species of sea slug apparently does not eat food from outside at all during his adult life, says Green. Instead, he relies on photosynthesis in the chloroplasts to produce his food. Green is now observing the slugs to see if the chloroplasts can divide and reproduce themselves within the animal tissue.

Green says his observations also lend credence to another theory: that higher plants developed from an early partnership between non-photosynthesizing plants and algae. The algae may have provided food while the host plant provided protection and support.

Alum serves double purpose

The use of alum as a precipitant for phosphates in sewage also results in precipitation of bacteria, report researchers at Pennsylvania State University. This could add to the pollution abatement value of alum precipitation by increasing the efficiency of the activated sludge left over from the effluent from the process.

Richard F. Unz and Judith A. Davis used the university's wastewater treatment facility for field tests—which consisted of bacteria counts in the effluent and in the remaining sludge. The studies showed that when alum was used, bacteria count in the effluent was lower and in the sludge higher.

Activated sludge is recycled through the wastewater treatment process. The researchers are not yet certain the bacteria precipitated by alum are the kind that biodegrade organic material; if they are, this could be a boon to the process.

A major goal of current water pollution policy is construction of tertiary treatment plants that would use such techniques as the alum precipitation of phosphates.

Squashing Iran

When India collided with Eurasia, it pushed up the Himalaya Mountains. Africa's collision with the same continent was apparently more complex. The leading edge of the Africa-Arabian supercontinent, says Man-ochehr Takin of the Geological Survey of Iran, can now be found in the Zagros folded belt of southwestern Iran. Sedimentary evidence shows that this region was underwater for more than 500 million years. A subduction zone developed along the southern edge of Eurasia to consume the ocean basin (the Tethys) separating Africa-Arabia and Eurasia.

Takin identifies three separate geological provinces in the rest of Iran. These, he writes in the Jan. 21 *NATURE*, were once microcontinents separated by narrow ocean basins. The northward drift of Africa pushed these continental fragments together. Compressions related to opening of the Red Sea and Gulf of Aden, Takin says, continue today.

Unraveling the Afar triangle

The Afar depression in eastern Ethiopia is the junction for three tectonic rift zones—the Red Sea, Gulf of Aden and East African rift systems. At least two researchers have concluded that Afar must be a triple junction where three crustal plates meet.

In the Jan. 21 *NATURE*, H. Tazieff and J. Varet of France's National Center for Scientific Research and F. Barberi and G. Giglia of the Italian National Research Council propose another interpretation. Recent field work in the Afar area shows zones of crustal separation parallel to the zone in the Red Sea. The northern end of Afar's separation zone occurs at the same latitude as the southern end of the Red Sea rift, so that Afar appears as a displaced segment of the Red Sea spreading axis. The Gulf of Aden's main magnetic anomaly runs directly into Afar, indicating that the main axis of spreading in the Gulf of Aden also passes through Afar.

The researchers conclude that the Gulf of Aden and Red Sea rift systems are a single tectonic structure connected by the Afar rifts. The East African rift system, they say, does not appear to be closely related tectonically to the Afar depression.

A peat paleothermometer

Various ways of determining the temperatures of past climates have been devised. One, for example, is to measure the ratio of oxygen isotopes in ice cores (SN: 11/7/70, p. 369). In the Feb. 4 *SCIENCE*, W. E. Schiegl of South Africa's Council for Scientific and Industrial Research reports that the deuterium content of peat may also serve the purpose.

Plants absorb deuterium from precipitation. The amount they absorb depends on the deuterium content of the precipitation, and this in turn depends mainly on climate; the cooler the temperatures, the less deuterium. Thus the deuterium content of recent plants is closely related to climate. From studies of peat samples deposited during the last 9,000 years, Schiegl has found a way to derive the amount of deuterium they originally contained. Using the technique, he has been able under certain conditions to determine past summer temperatures in the Netherlands.